

Using BMPs and LID to Work with Nature in Reducing NPS Pollution

Wisely Managing Our Urban Water Resources

Neal Shapiro, City of Santa Monica

NPS Conference, Ventura, CA

November 5, 2003





QUESTIONS, that want Answers

What water quality issues the City of Santa Monica addresses?

How does the City's urban runoff management program (URMP) manage that is, reduce, NPS pollution?

What funding mechanisms support the City's URMP?

What has worked and not worked? Why?

How does the URMP fit into the TMDL program?





OBJECTIVES, ***the Answers***

Harvest stormwater for groundwater recharge and pollution treatment

Connect land use/design to the Hydrologic Cycle, reducing the disconnect and disruption of water flow

Mimic nature; land use blend in

Take proactive, watershed approach to reducing urban runoff problems

Convert a perceived “waste” into a valuable resource for reuse - SMURRF

Treat all dry weather and some wet weather urban runoff leaving the City






Urban Runoff – What is it?

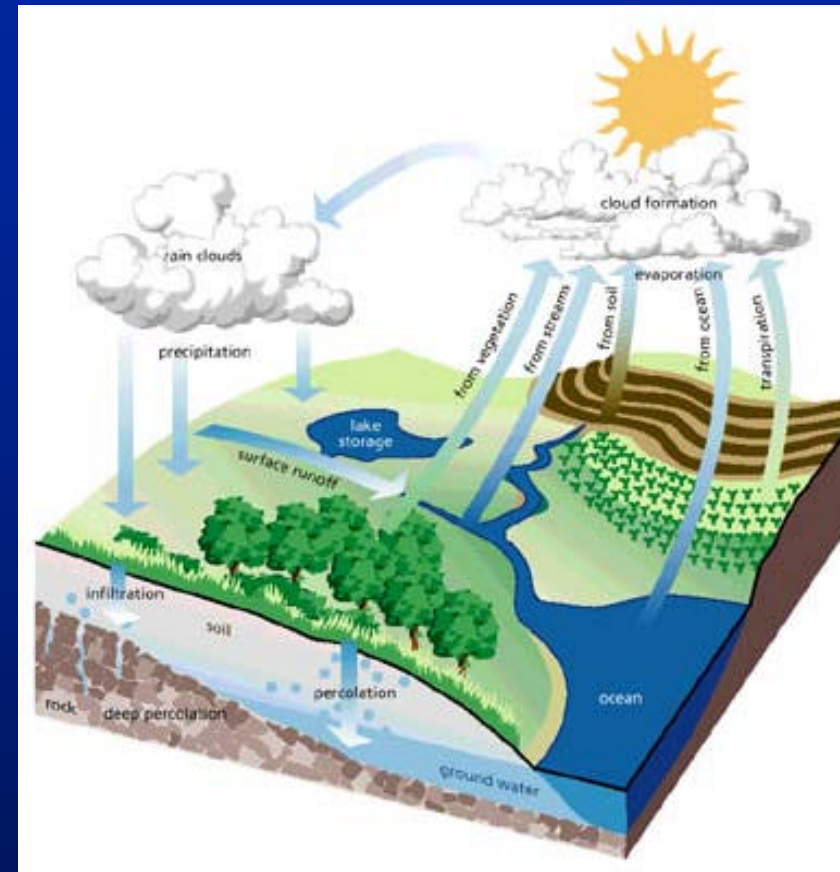
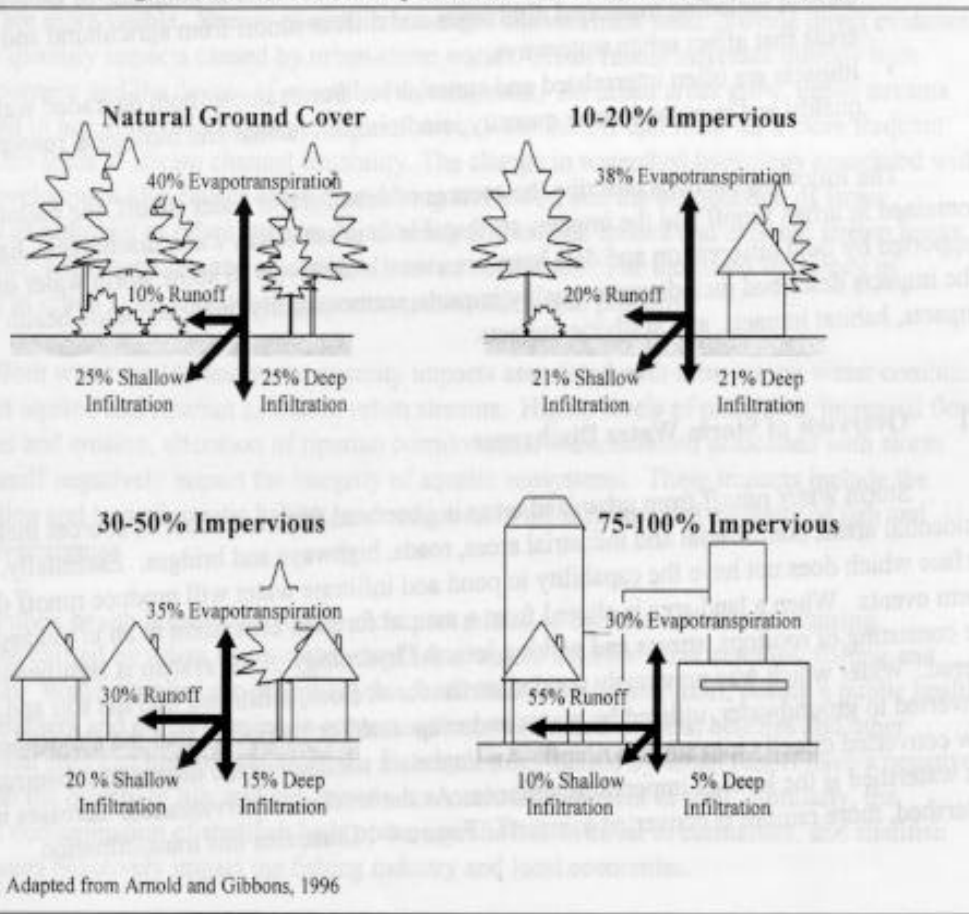
The Problem – Water Quality v. Quantity

The Southern California Coastal Water Research Project, a leading marine research group in Southern CA, reported that storm water and urban runoff are the leading source of water pollution in the Los Angeles area; storm water pollution has increased 200-700 percent during the last 20 years.

- Stormwater has become a lethal cocktail of pollutants that now constitutes the single greatest source of water pollutants, contributing 50-60 percent of the pollutant load.
 - Types and Sources of Pollutants
 - According to the US EPA, urban stormwater is the largest source of water quality damage to estuaries, the second largest for wetlands degradation, third largest impairment of lake and fourth largest source of river damage.
- 

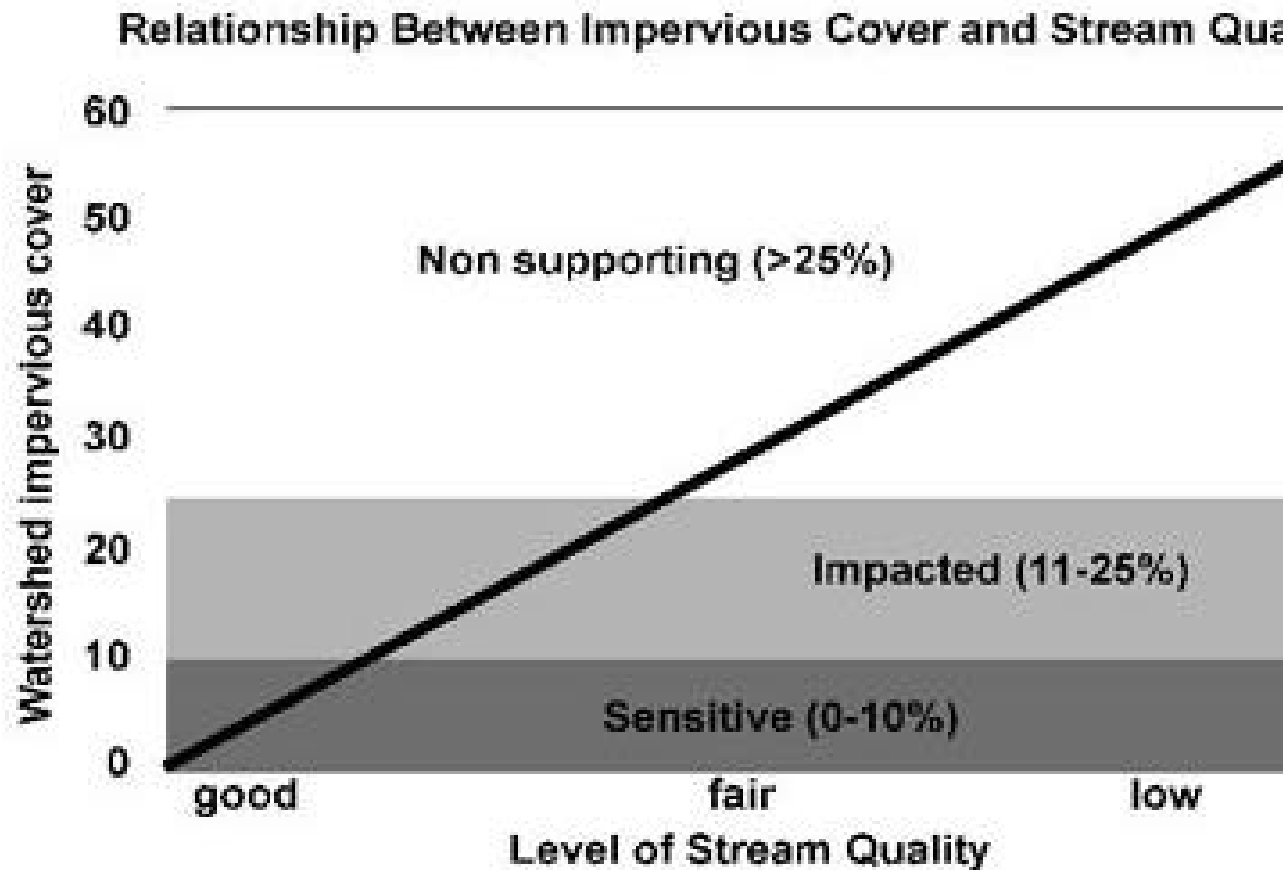
The Watershed Level – Disrupting the Water Cycle

Figure 4-1. Effects of Imperviousness on Runoff and Infiltration



- How water flows through our environment

**As hardscapes
increase, water
quality goes
down.**



Source: Schueler, T. 1994. *The Importance of Imperviousness*
In: *Watershed Protection Techniques* 1(3):100-111.



Paving Our Way to Water Shortages: *How Sprawl Aggravates Drought*



Turning Impermeable to Permeable





City Attractions



An Environmentally Concerned Community



- History of Political Activism

- Concern Over the Environment



Study links rains, bay sickness

ed runoff after storms can
sk of illness for swimmers
ward
long suspected it, health officials have skirted it, and many
t even thought about it.
here is an answer to the long-asked question: Can swimming
a Bay make you sick?

TROUBLE IN THE BAY

MALIBU
A Malibu Creek and Lagoon
B Topanga Canyon Blvd.
PACIFIC PALISADES
C 16801 Pacific Coast Hwy.
D Chouatqua Blvd.
E Puiga storm drain
SANTA MONICA
F Montana Ave.
G Santa Monica Pier
H Pico Blvd.*
I Ashland Ave.
VENICE
J Windward Ave.
MARINA DEL REY
K Ballona Creek
LAX
L Imperial Hwy.
REDONDO BEACH
M Herondo St.
N Redondo pier
O Avenue I

* Usually diverted, but occasional runner occurs
Source: Heal the Bay

WARNING
NO SWIMMING
PELIGRO
NO BATHING

TESTING THE WATERS

Health of region's shores threatened by urban runoff

By Harrison Sheppard

**Local tourism dampened
by stream of bad news**
Visitor industry threatened by L.A. image



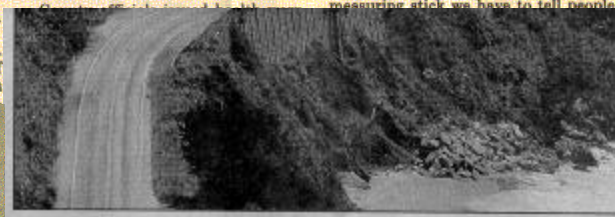
**Venice m
fund-rais
Art Walk set**

Warning: Beach bacteria hazard often

Report card grades 48 beaches in the South Bay, Westside/A9

"They fail to tell people about the routine violations."

"It's the only protection the swimmer has," Gold said. "It's the only measuring stick we have to tell people



The coast along Big Sur. Some officials said while the results were troubling, the v

Beach Closings Reach Record Levels in State

■ **Environment:** Survey finds 3,547 instances of pollution problems last year.

By SEEMA MEHTA
TIMES STAFF WRITER

California's famed coastline is far more polluted than previously thought. From San Diego to San



Our Times Times Santa Monica

Danger of urban runoff noted

■ Assemblyman Nakano tells folks at Venice meeting bill would address pollution caused by older roads.

Laura Wides
OUR TIMES

VENICE — A panel of experts including state Assemblyman George Nakano alerted local residents Tuesday night to the dangers of polluted urban runoff and its effect on Los Angeles beaches.

The Democrat, who represents Venice and a number of South Bay communities, urged people attending the Venice

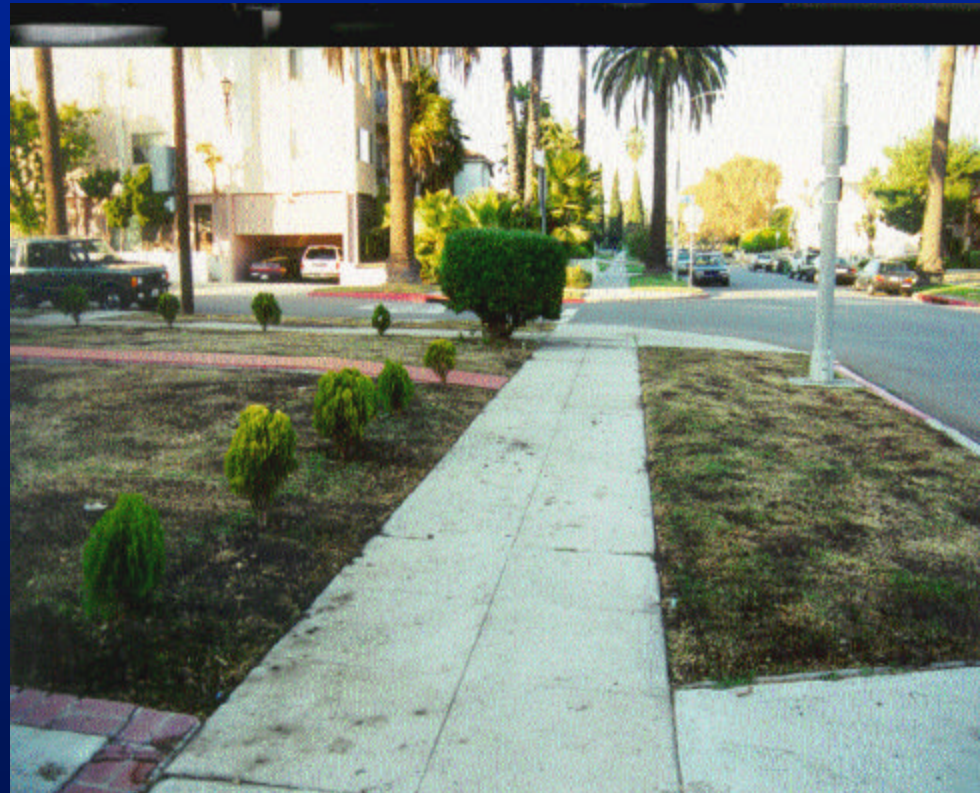
Examples of Local Urban Runoff



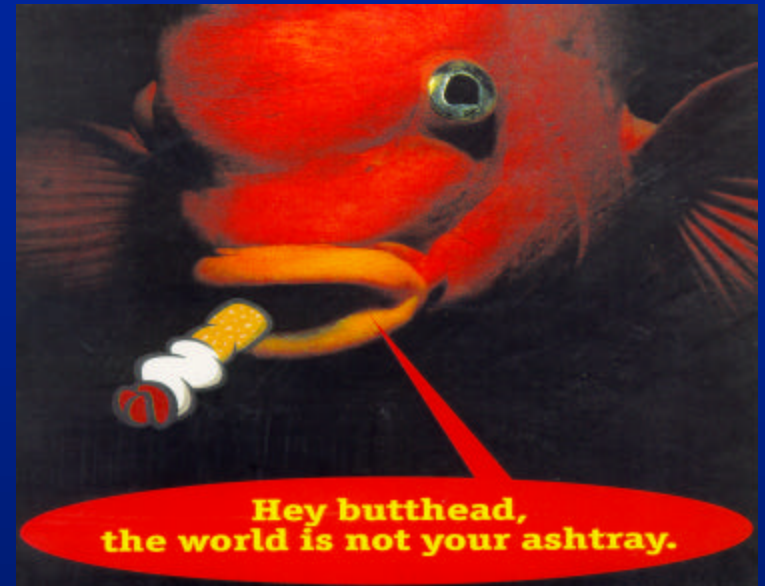
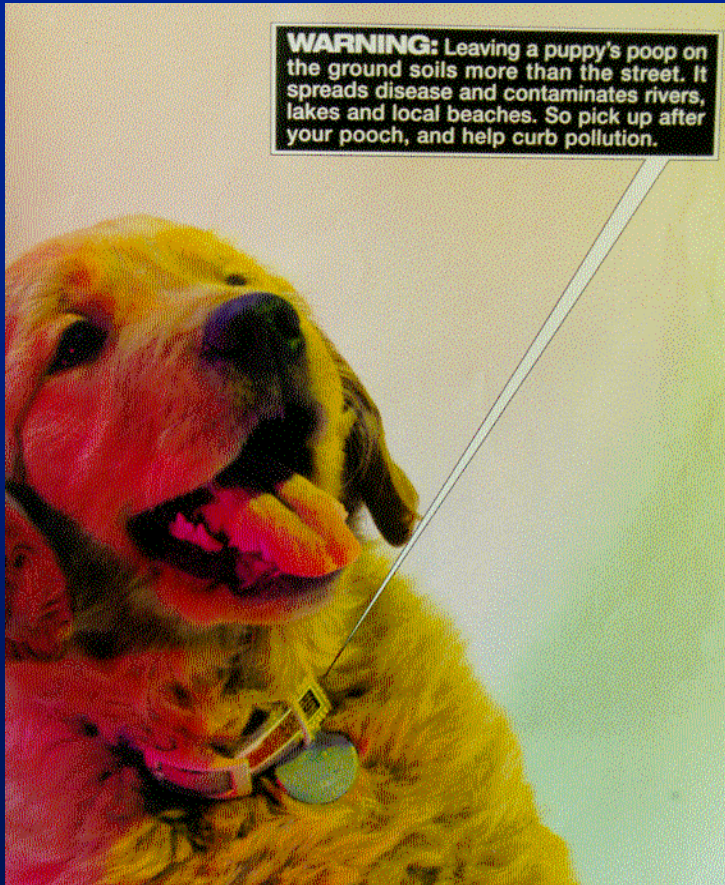
Petroleum Derivatives



Wash water & Fertilizers




Even the little things contribute to urban runoff



Caltrans reports that 20% of the material removed from freeway storm drain inlets is cigarette butts (UCLA Environmental Report Card 1999)

City Staff Working Together to Do More with Less

Open Spaces - Pets	Wastewater – CB/SD cleaning	Finance – parcel/runoff fees, grants	Engineering – BMP design in new projects; Airport gunite
Street Sweeping			Building & Safety - COOs
Source Management			
GIS – mapping CB/SDs, BMP locations	Urban Runoff - EPD		Planning – start of new project
Solid Waste – recycling/trash spills			Utilities – ind. waste, recycled water
	City Attorneys – ordinances, enforcement, contracts	Enforcement – wasting water, no BMPs, pollutant spills	
Parks/Recs - irrigation			



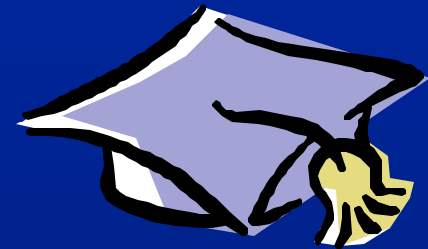


Tools of the Trade

- **Education**
- **Prevention**
- **Ordinances**
- **Treatment**
- **Maintenance**
- **Enforcement**
- **Funding**



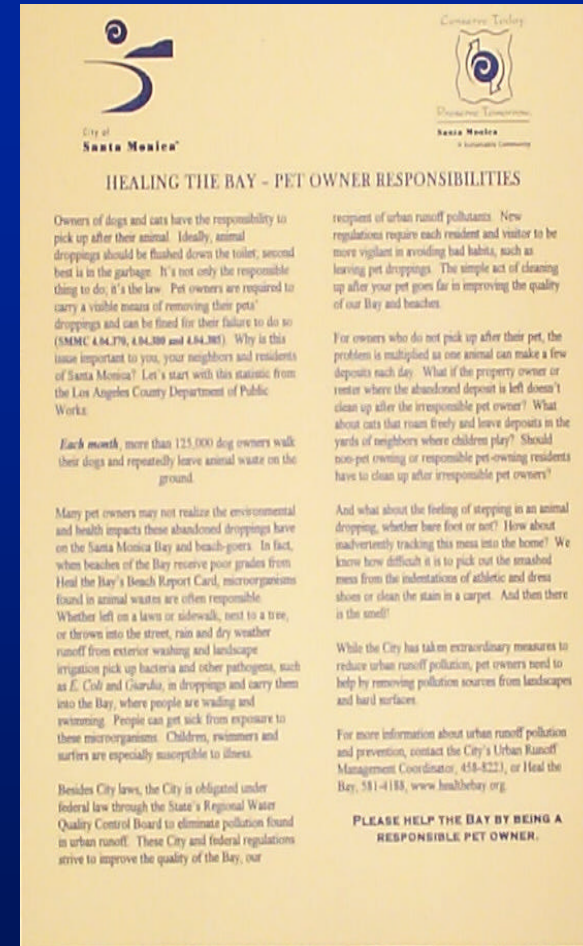
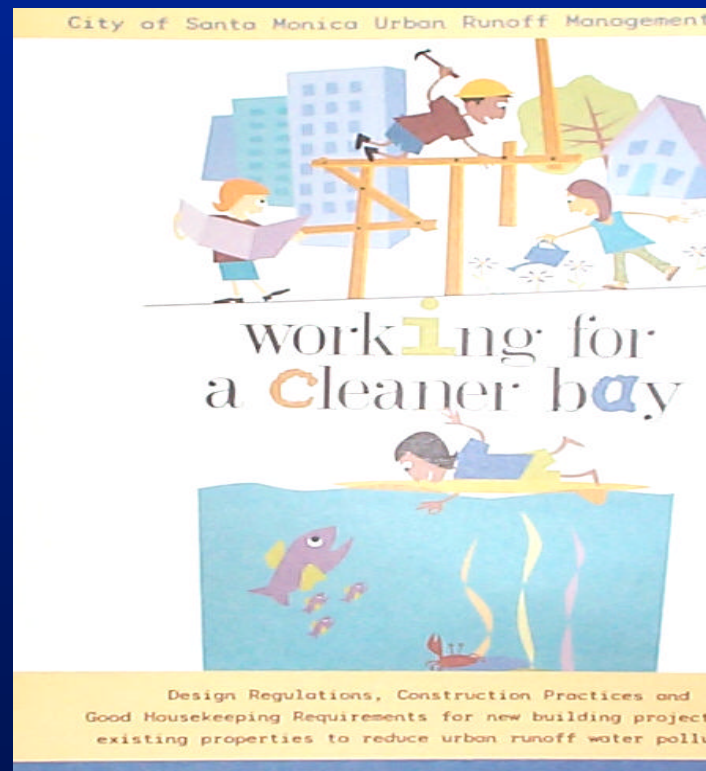
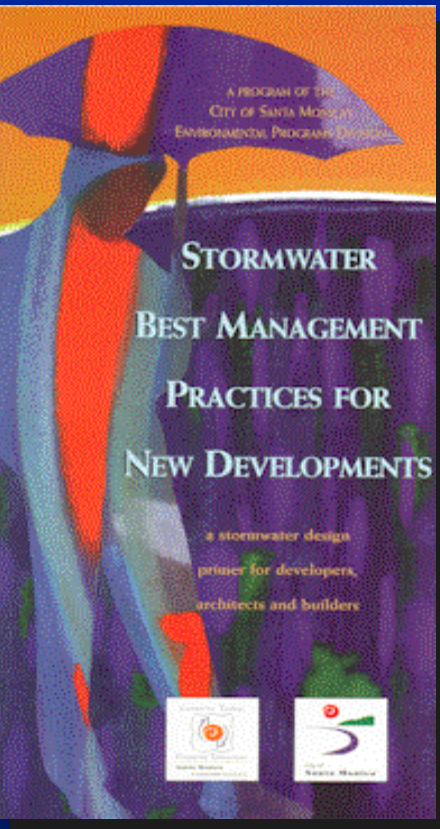
EDUCATION & PREVENTION



- Brochures
- Radio / TV Spots
- Newspaper Articles/Ads
- City's Web Sites & Green Building Web Site
- Catch Basin Stencils/Tiles
- Educational Information at Facilities
- City Employee Training



Brochures and Handouts



City's Web Site

www.santa-monica.org



Green Building Web Site

greenbuildings.santa-monica.org

Pier/Catch Basin Signage



310.458.8945



Pet Walk Parks




ORDINANCES



- Urban Runoff Pollution Code
- Stormwater Utility Parcel Code
- Local Building Code
- Local Zoning Code
- Sustainable City Code



Urban Runoff Mitigation, Stormwater Parcel Fee

- New Development & Runoff Mitigation Plan, including City projects
 - Retain 0.75"
 - Good Housekeeping BMPs
 - Construction Site BMPs
 - Penalties - \$500/day
 - Flexibility
 - In-Lieu Fee/Mitigation Banking
 - New Development Threshold: Value of new construction is 50% or greater compared to the replacement cost of the existing improvement
 - Stricter standard than LA Regional Water Board Standard
 - About \$1.2 million annually
- 

Results Since 1993

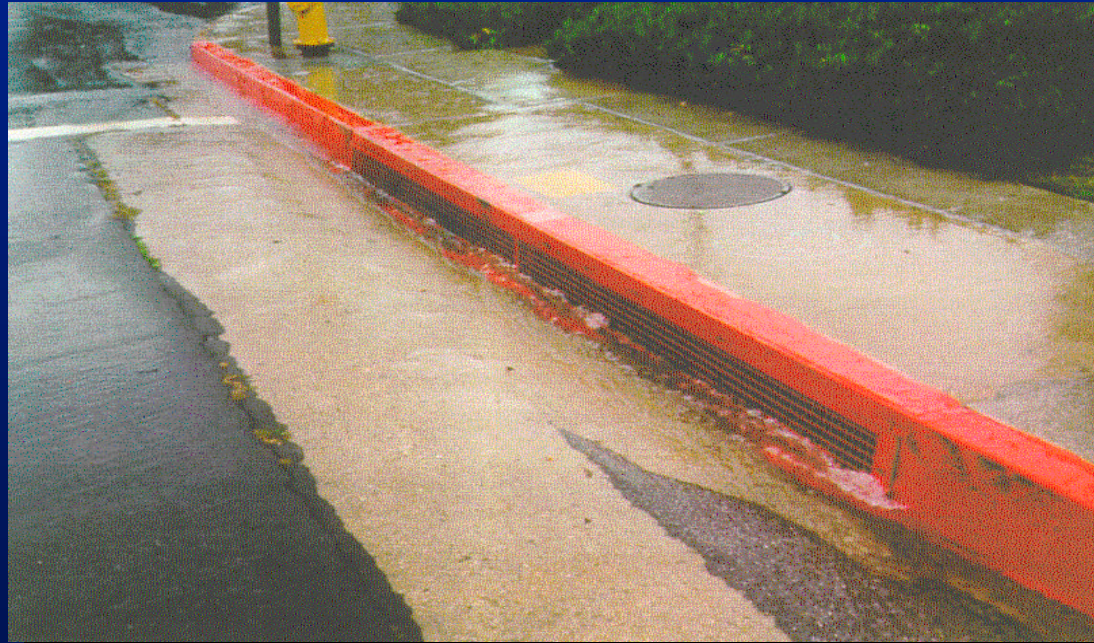
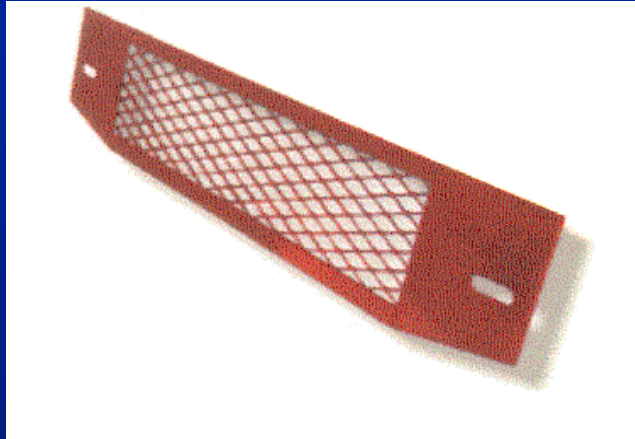
- Number of Projects
 - Single-Family: 240
 - Multi-Family: 65
 - Commercial: 70
 - Unknown: 70
 - City: 12
 - BMP Ave. Costs: \$0.50 - \$3.50 per gallon, one-time
 - <1.5% of total project cost
 - Design Storage (gallons)
 - Single-Family: 184,000
 - Multi-Family: 130,000
 - Commercial: 342,000
 - City: 100,000
- 

TREATMENT – Local

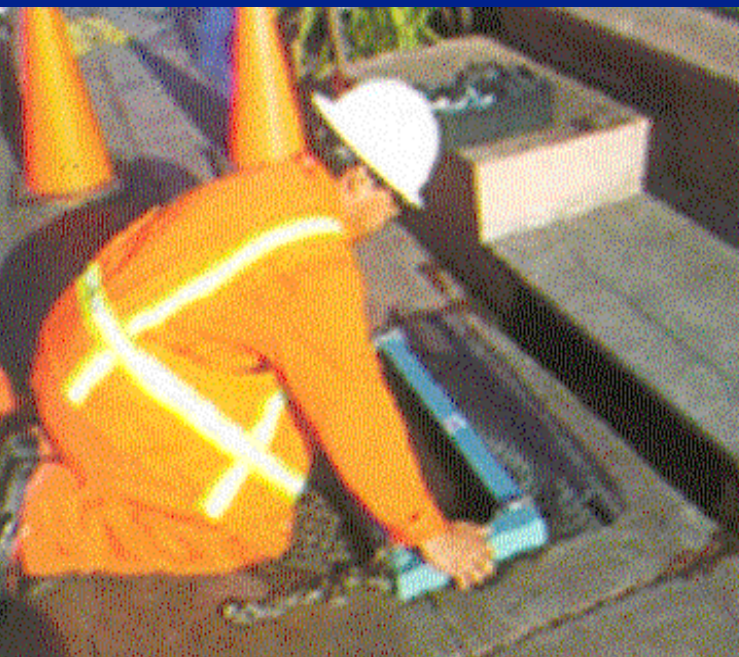
- Catch Basin/Storm Drain Inserts



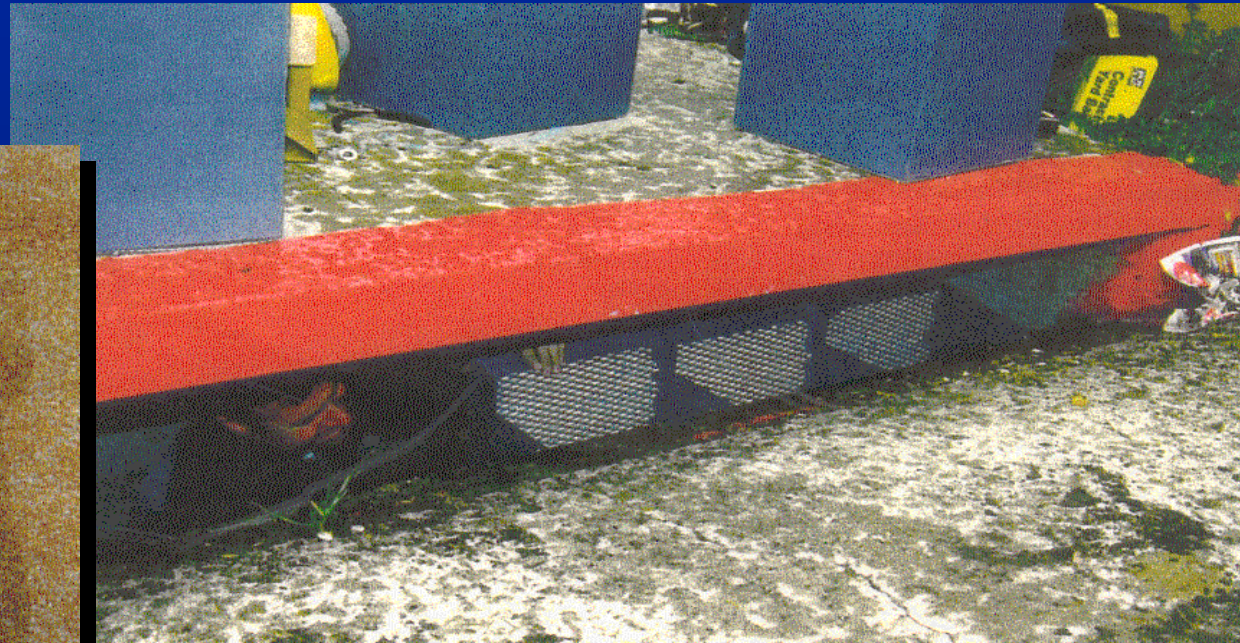
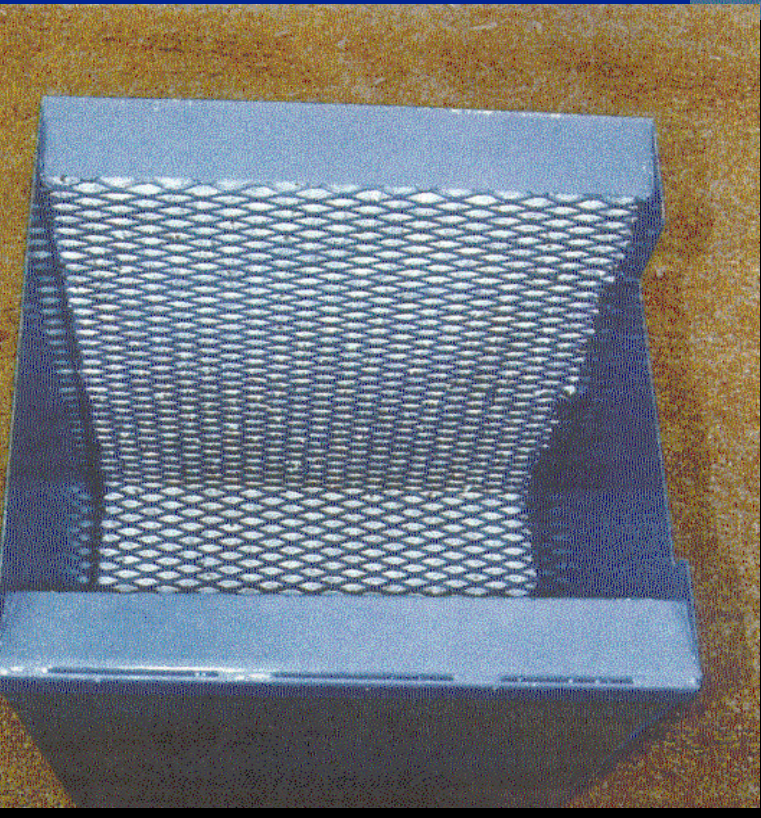
Catch Basin Screens



Screening Catch Basin Insert



Filtering Catch Basin Insert



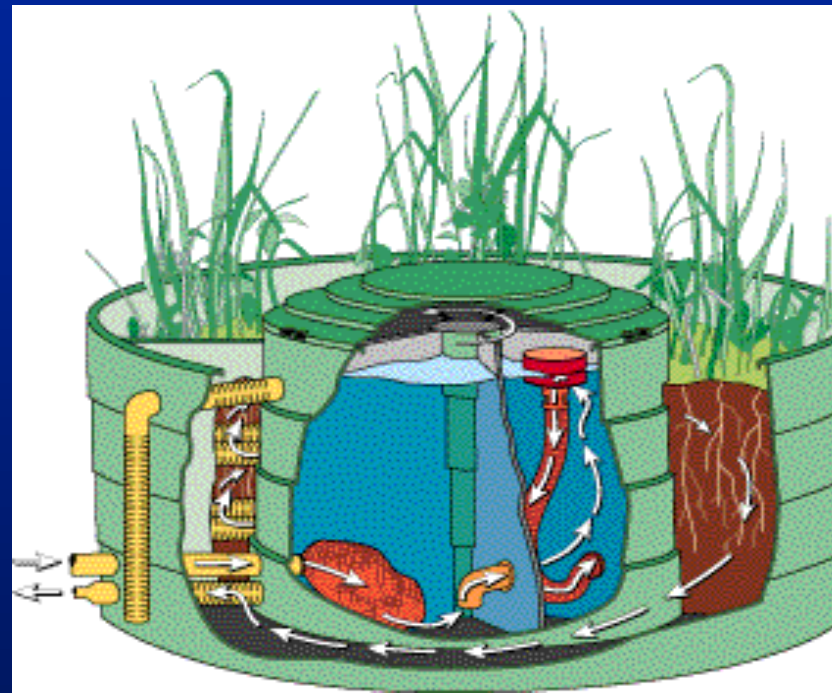
Onsite Basin with Trash Insert



Onsite Basin with Filter Insert



Onsite Basin with Filter Insert

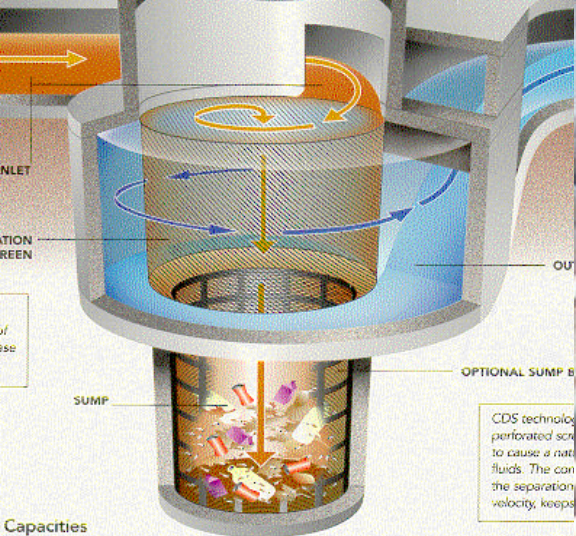


TREATMENT – Large Area

- Separation and Filtering (in-line) Devices
- Devices installed as maintenance holes or diversion structures



Separation Device



Capacities
atures

Model	Treatment Capacity	Design	Sump	De
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**Trash,
debris,
sediments,
oil, grease**

Filtering Device – solubles: metals, organics, nutrients



Onsite Retention

City Facilities

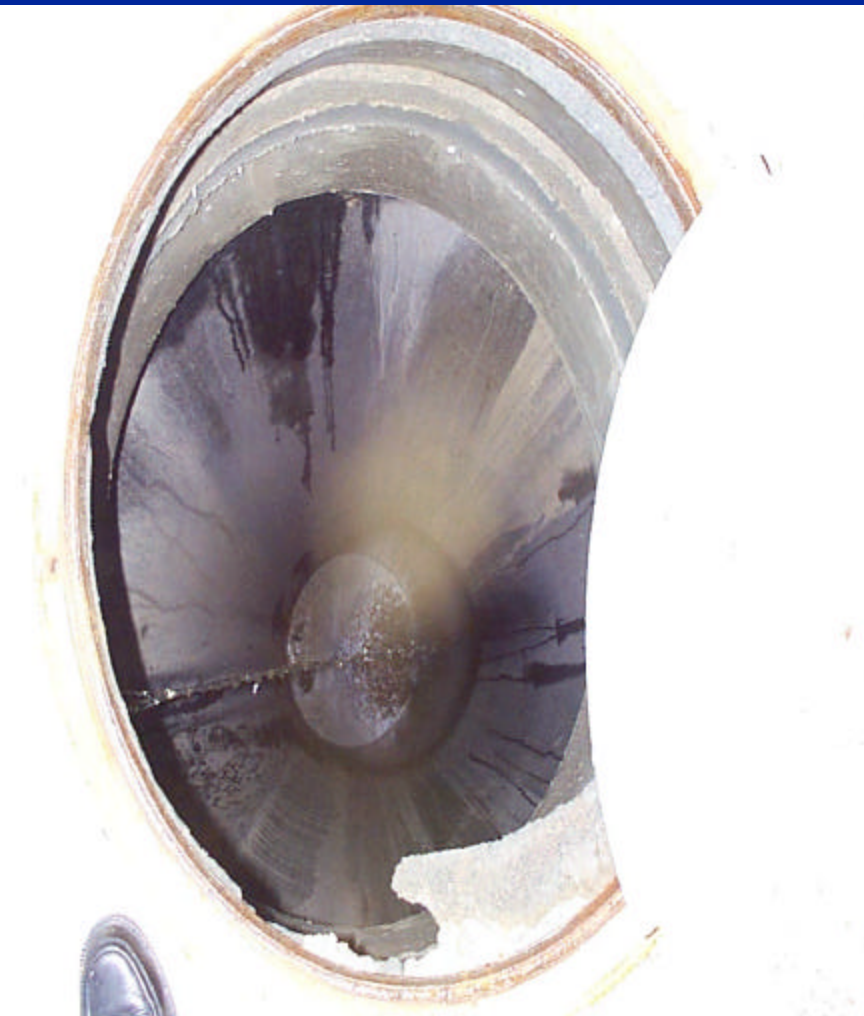


Onsite Retention-private businesses





Drywell BMPs-single/multi-family

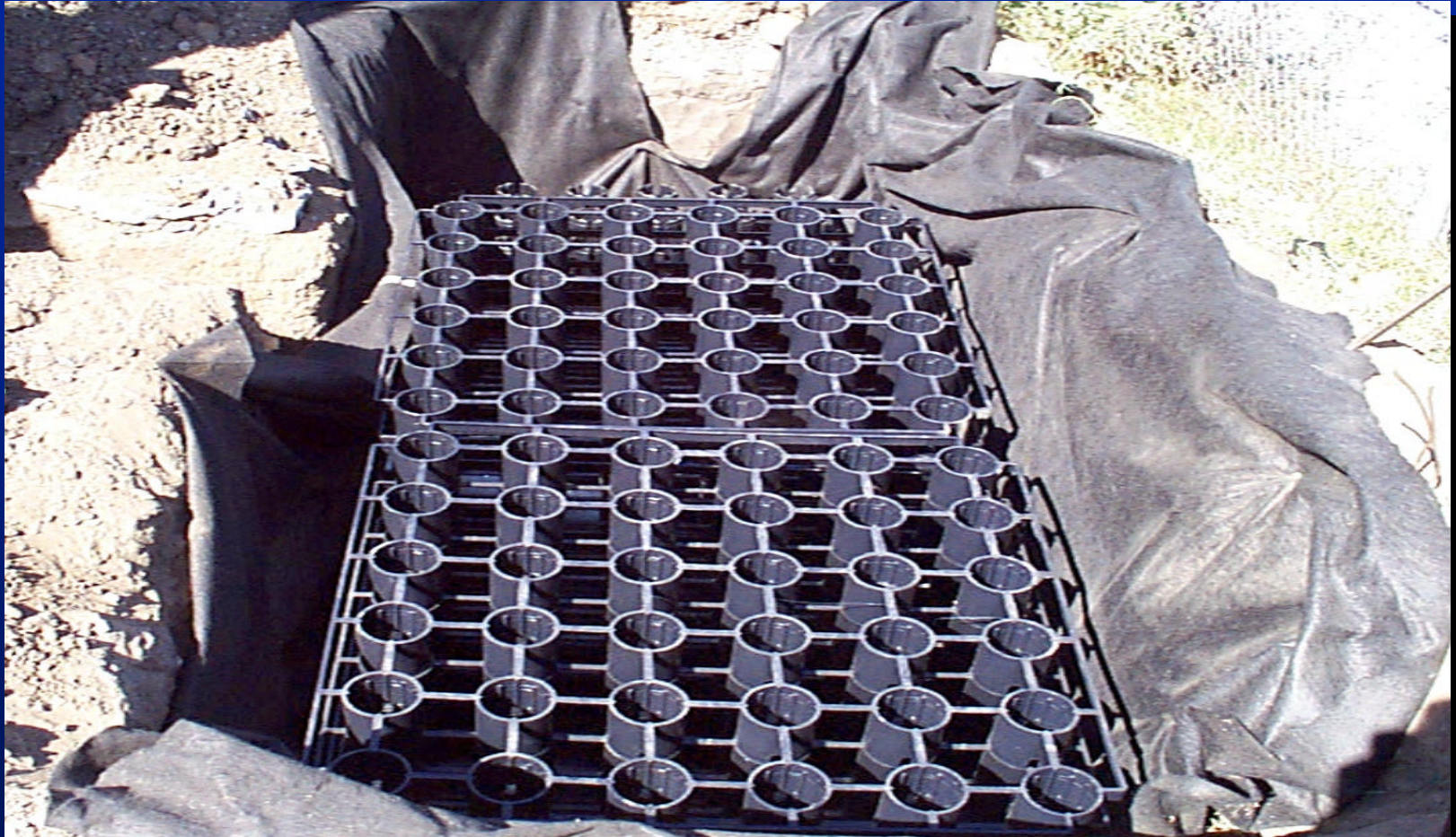


Infiltration Pits

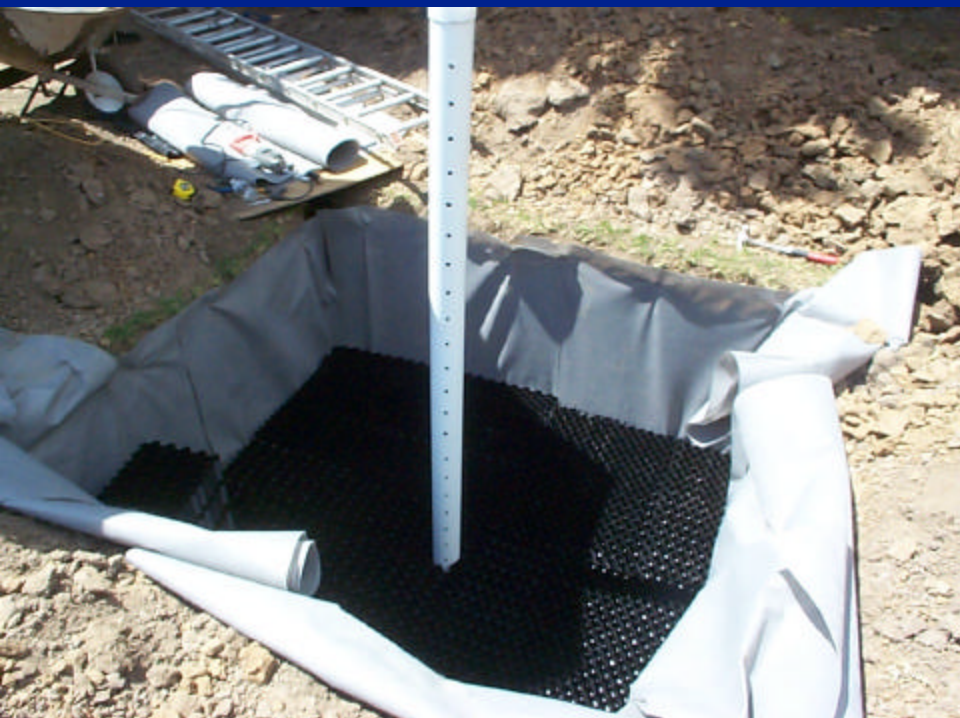
BMPs



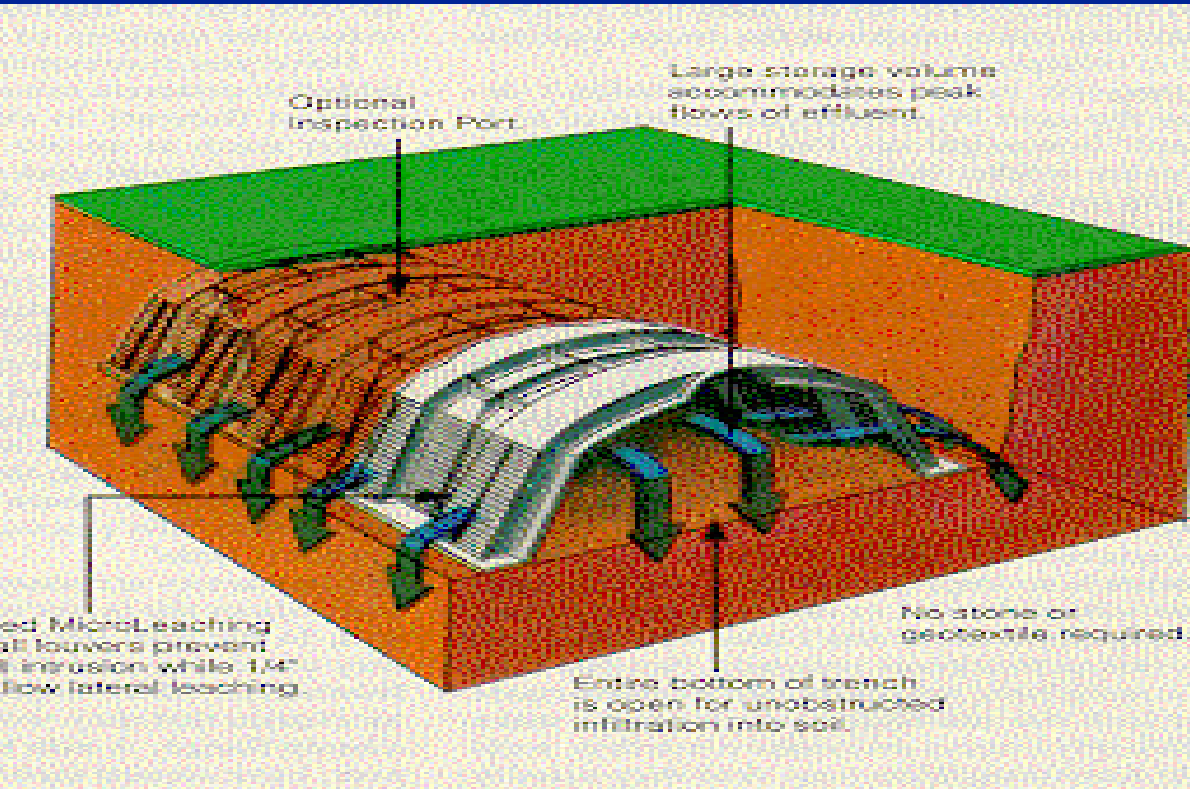
Onsite Retention



Onsite Retention:



Onsite Retention



Big Projects



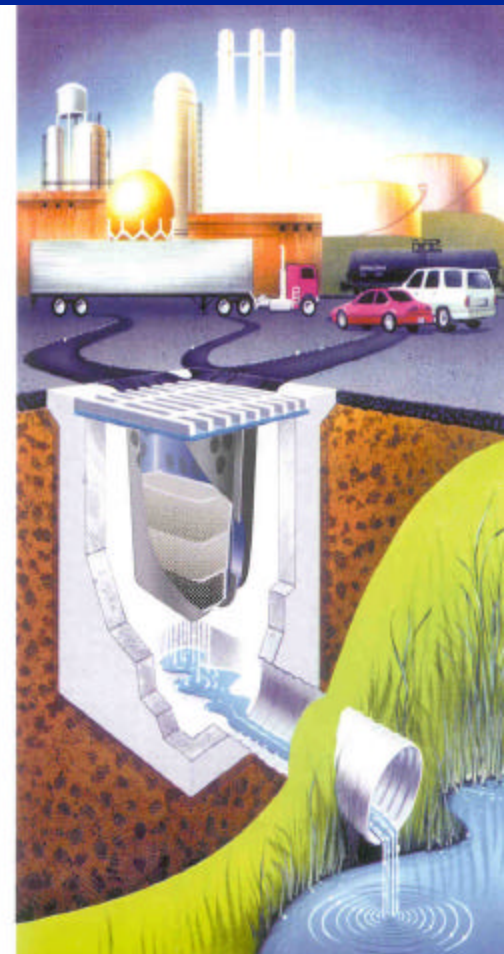
Permeable Paving



Use of Parkways



- Price for a typical catch basin insert range from \$1500.00 to \$2500.00.
- Removes hydrocarbons, organically bound metals, PCB's, pesticides, VOC's, sulfides and other contaminating waste products from wet weather and industrial runoff.
- Certified laboratory tested.
- Recognized as a "Best Management Practice".
- Can be customized to remove site specific substances.
- Satisfies structural BMP requirements for NPDES compliance and most local regulations.
- Can replace most oil-water separators at a fraction of the cost.
- Retro-fit existing catch basins or customize for new drain systems.
- Can work with or without internal sedimentation chamber and/or in conjunction with other BMPs.
- Flexible installation for various catch basin sizes.
- Equipped with an overflow bypass to assure continued flow in the event of high volume storm events.
- Patented System.



Parkway Infiltration

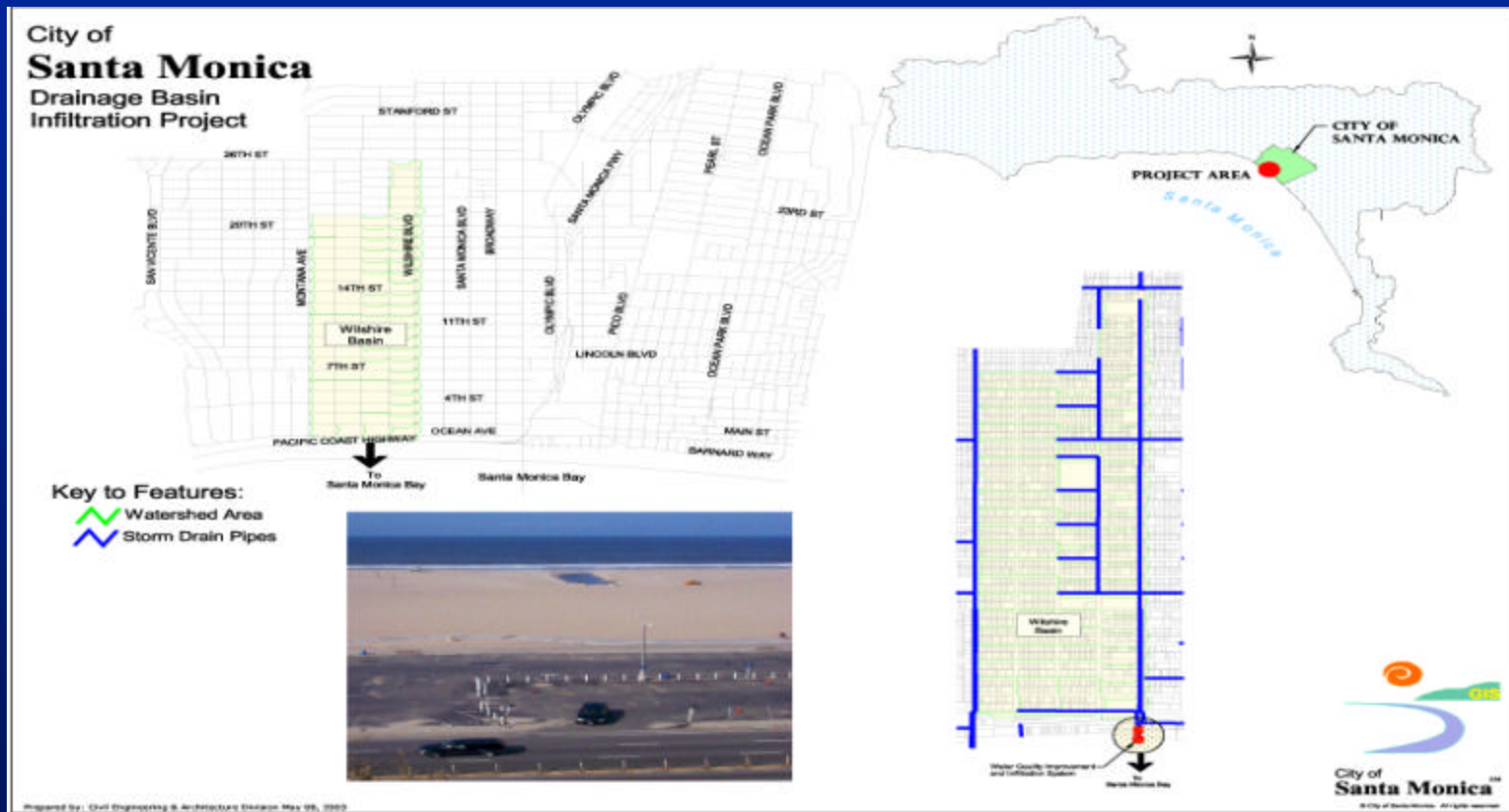




Centinela Pico-Pearl Project



Montana/Wilshire projects



16th street project

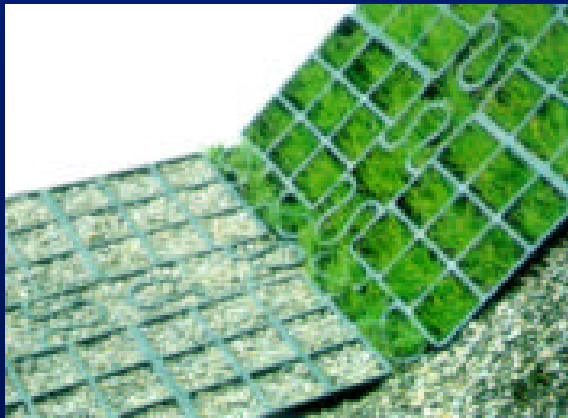
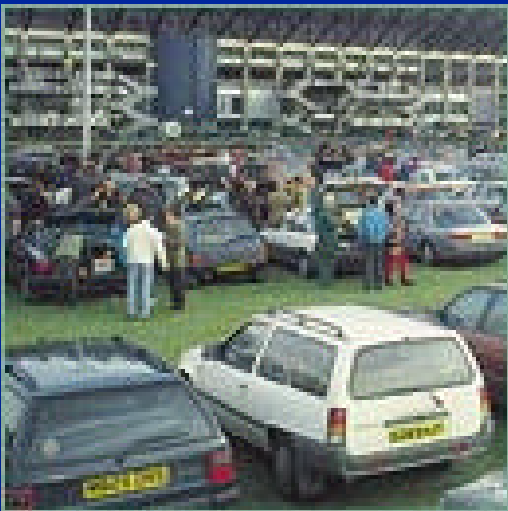
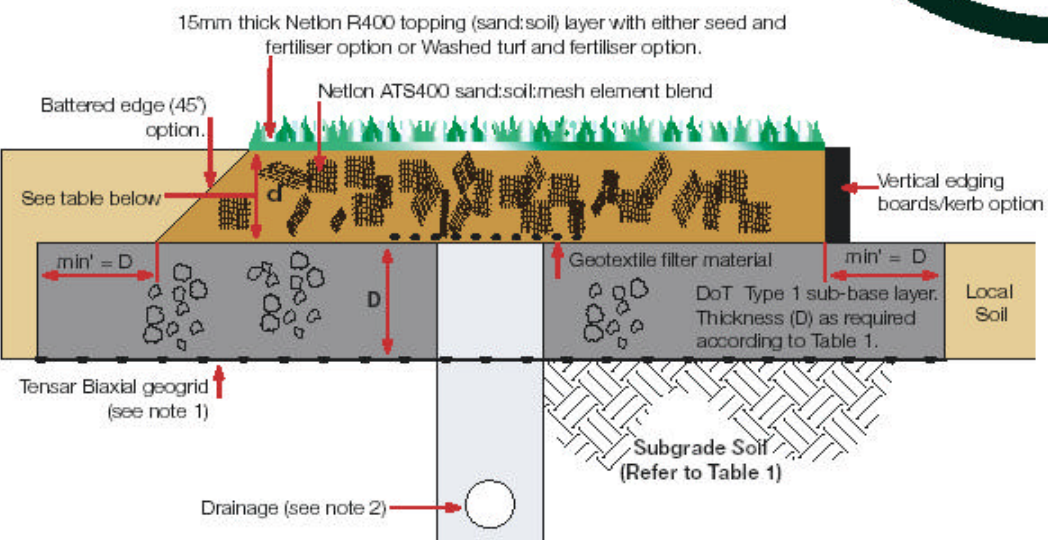


Green Beaches project





Typical Profile





Funding Mechanisms

Urban Runoff Ordinance, in lieu fees

Stormwater Utility fees

Grants: County: Proposition A, MTA

State: Proposition 12, Proposition 13
(multiple phases), Proposition 40, CA

Integrated Waste Management , PIE

Federal: ISTEA, Possible 319(h),
Possible Call for Projects, EPA Water
Initiative

MWD: ISA

Colorado one, possible



SMURRF

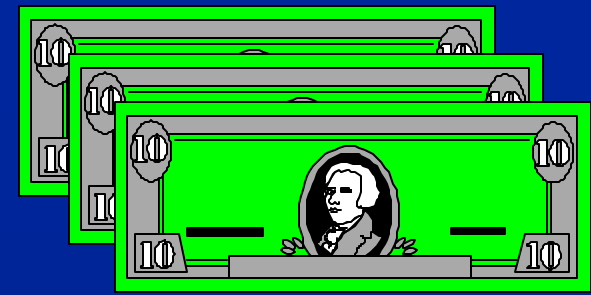
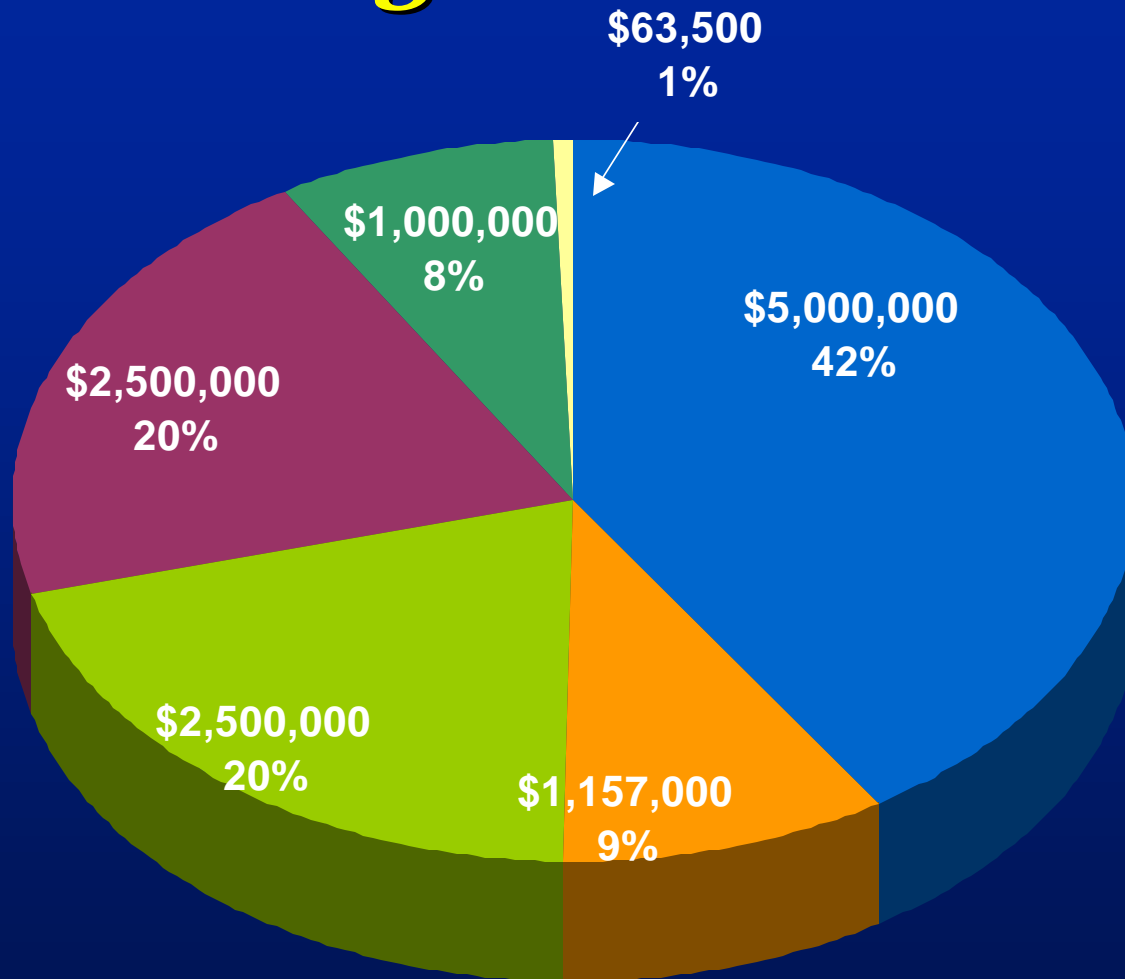
Santa Monica Urban Runoff Recycling Facility

Joint Santa Monica-Los Angeles Project

- Reuse a local water resource.
- Keep a pollution source out of Santa Monica Bay.
- Reduce imported water supplies & impacts on other watersheds.
- Open, walk-through facility to educate the public.
- Up to 500,000 gallons/day, ave. is 25,000
- 3% of City's daily water use.
- \$12 Million
- \$175,000 O&M



Funding Sources

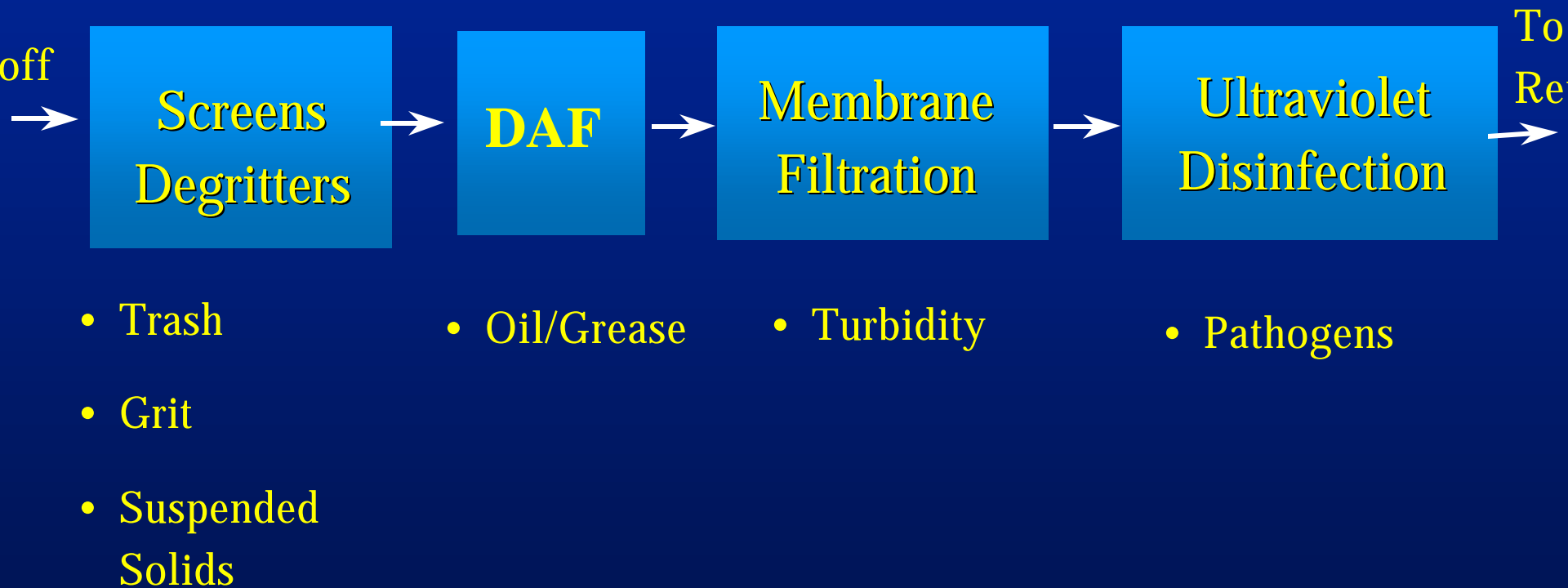


- State Revolving Fund
- ISTEA
- City of Santa Monica
- City of Los Angeles
- LA County, Prop A
- In Lieu Urban Runoff

MWD Rebate: \$45,000 (credit)
(estimated)

Based on:
300 AFY of delivered water
@ \$150/AF

Recommended Treatment for Reuse with Recycled Water



Rotating Drum Screen



Grit Chamber

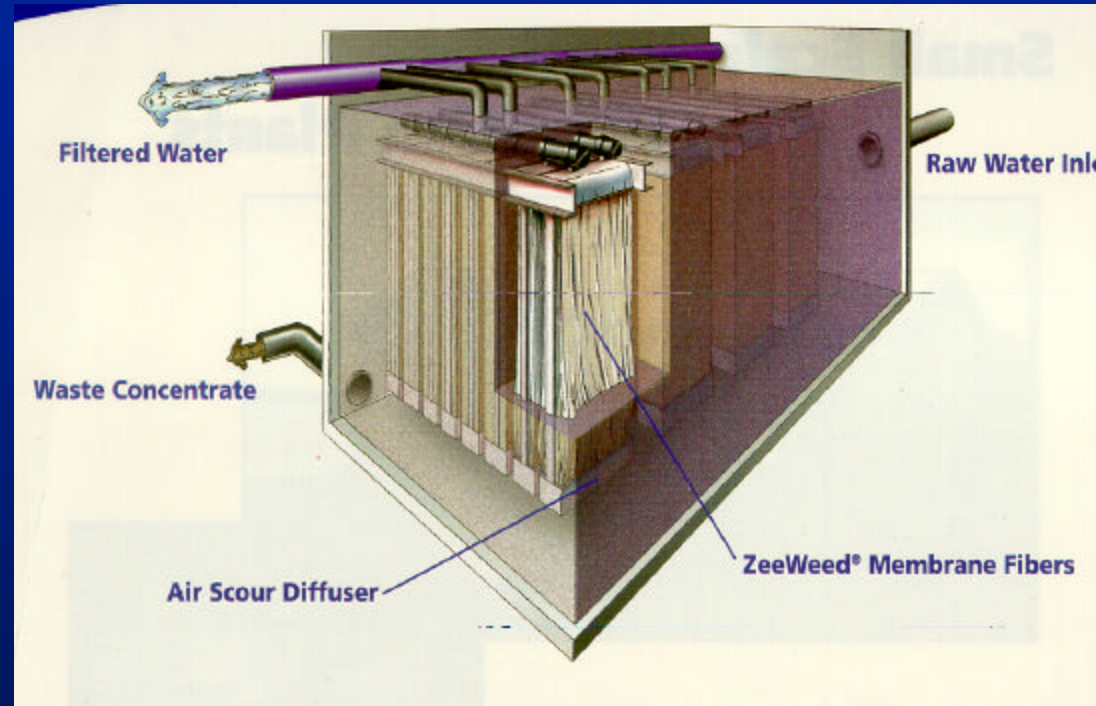
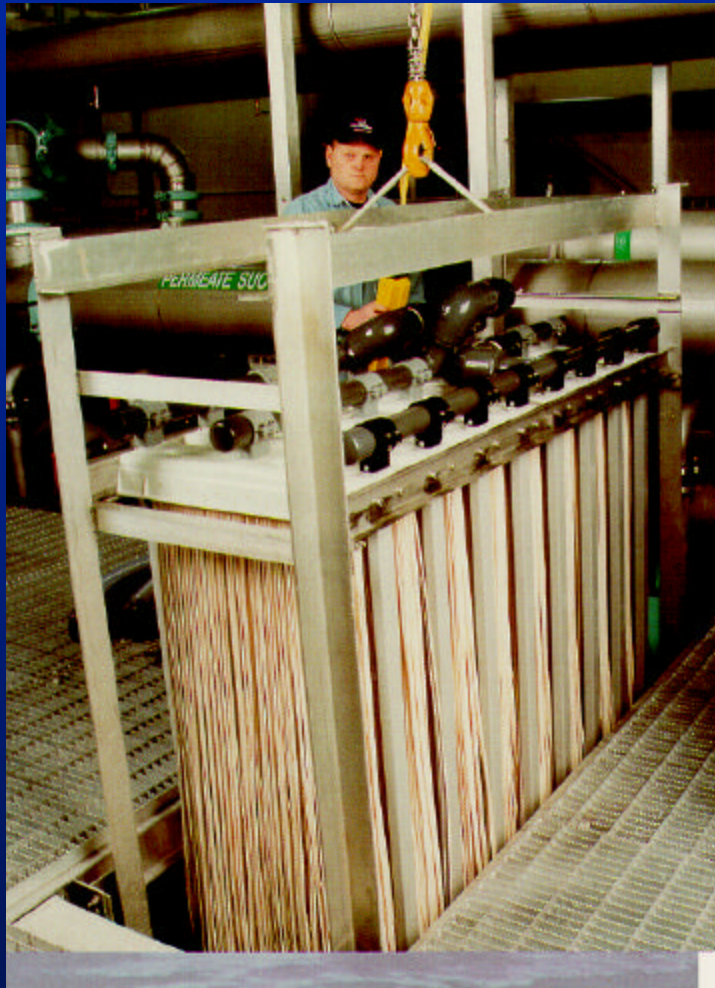


Dissolved Air Flootation



Microfiltration





UV Radiation Channel



Finished Waterfall & Reservoir

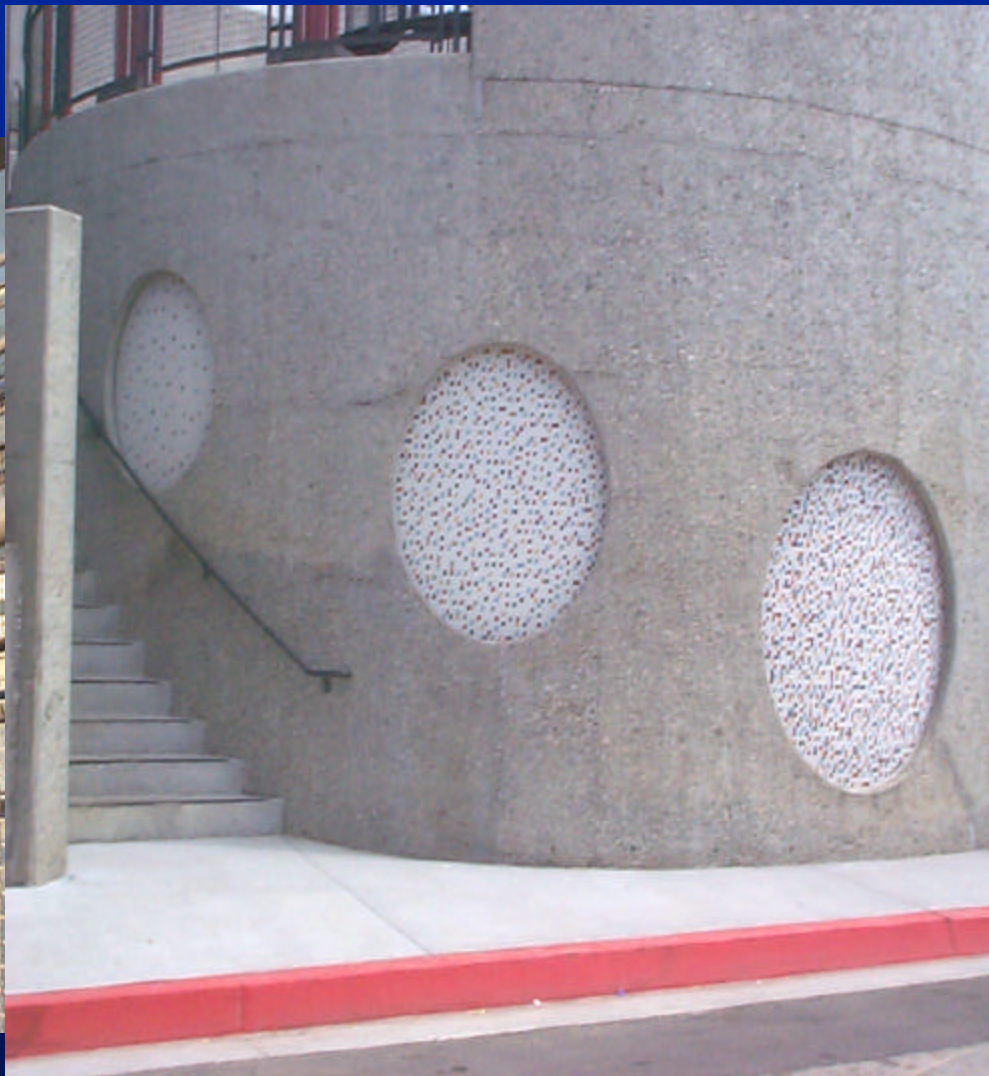


SMURRF Educational Panels





Artwork





Water Quality Issues Addressed

Pollutants of Concern Found in Urban Runoff

Trash, Bacteria, Heavy Metals, Organics,
Nutrients, Oil/Grease

All Dry Weather Flows

80% Wet Weather Flows (3/4" storm events)





Synergy with TMDLs

BMPs designed to provide long-term treatment and compliance with NPDES and TMDL regulations and standards.

BMPs are dynamic in design, and multi-stage treatment train where appropriate

Pushing micro-watershed infiltration to comply with water quality regs and future local water supply






What has Not Worked, Why

StormTreat: Arid climate v.
Year-round rain

Catch Basin Inserts: O&M
reality check, pick the right
ones

Still have many projects to
install so in the next few
years, the City will gain more
experience with new BMP
systems





What has Worked, Why

Vortex Separation-Screening: End of pipe,
O&M, no moving parts & electricity, gravity-
flow

Catch Basin Inserts: Select the right one for
the right location, O&M program

Permeable Paving: Design and installation,
O&M program

Recycling Facility: Design, O&M

Post-Construction BMPs





Managing NPS Pollution:

How the City URMP Works

Primary Strategy: Infiltration through Smart Growth, Low Impact Development strategies

Secondary Strategy: Multi-POC Treat & Release strategies



Thank You



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